Charger Tek

"Scientists study the world as it is; engineers create the world that has never been." -- von Karman

Patoka Valley PLTW Regional Partnership - http://patokavalleypltw.org/default.aspx

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Pike Central HS PLTW

Petersburg, IN

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This is the 1st issue in a series (I hope) of this newsletter. I hope to issue one at least monthly during the school year.

You may follow the Hybrid HMMWV project at http://humveeproject.blogspot.com/

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PC Perspective - ASNE

By: Brandon Bohnert and C.M. Brown

Five Students from the HEV Wraith team went to the ASNE Conference in Bloomington, IN. ASNE stands for American Society Naval Engineers. The conference is held every two years at the Bloomington Convention Center. C.M. Brown, Anna Woolery, Brandon Bohnert, Travis Wood, and Alex Morton attended under the supervision of Mr. Ray Niehaus.

We had a booth set up with information about what we are doing in the Project Lead the Way program. We also had a presentation set up about the HEV Wraith Project. We talked to numerous people from different organizations from across the country and even over seas. Visitors of the booth could not believe that a high school is working on a project of this magnitude.

The students that are working on the H.E.V. Wraith Project are: Alex Morton Brandon Bohnert, Damon Steltenpohl, Anna Woolery, Josh Steineker, C.M. Brown, Richard Newkirk, Jeff Estey, Emily Burns, Ethan Smith, Josh Greenwell, Dustin Morton, Travis Wood, BreAnn Lane, Eric McCord, Josh Stieneker, and Ian Dudenhoeffer.

The name of the project is H.E.V. Wraith H.E.V. stands for Hybrid Eclectic Vehicle and a Wraith is an evil specter.

We are currently calculating the horse power, RPM, and gear ratios. Everything we are calculating must be precise to get the Humvee to run with perfection. We have also decided to change the Humvee from the 8 cylinder to a 4 cylinder engine. We are converting the Humvee to electric as well, and will be using a new type of battery called a Lithium-Ion Titanate battery that does not have thermal events. A thermal event happens when a battery is pierced causing it to rupture. When ruptured, a battery will blow up causing battery acid to be shot out which is very hazardous.

The drive-train design involves a four cylinder engine with a driveshaft running through an electrically actuated clutch connecting to a generator/motor running through another electric clutch connecting to a motor/generator through a final electric clutch through the transfer case into the rear axel driving the vehicle. The generator/motor is an electric motor that when turned produces power and can double as a motor if necessary. The motor/generator is the main drive motor but like the generator/ motor it can double as a generator if necessary. Right now the military pulls a generator trailer behind the Humvee, so we want to make it a generator itself to run lights, welders, etc. off of the batteries. We will also be trying to exceed what the maximum battery capacity that is currently in other hybrid Humvee prototypes.

Our goal is to be able to exceed forty miles out and back running only on battery power. This means that the military wants to be able to drive to their destination running on battery power and back to their base. We are also trying to exceed fifty miles per hour or highway speed running on electric power. We chose this design over other options because it is most feasible for a military purpose and because it meets the constraints that were given to us.

The purpose of the project is not only to increase the fuel mileage but to create a kit to retrofit existing Humvees over to this system. We want to be able to ship the kits across seas to military bases so that the new systems can be bolted to the existing Humvees with as little cutting and modifying to the original chassis as possible.

Right now we are working on the project plan, and will be removing the eight cylinder engine soon. John Melhiser is allowing us to rent the service station, across from the Do It Best hardware store in Petersburg, to work on the Humvee. We have had several meetings for the Humvee recently include meetings with Crane Naval Base, Indy Powers, and Solar Sources. We want to tie the community into the project as much as possible, and several of the components we will be using are manufactured in Indiana.

We plan to have the project completed in twelve to fourteen months. We are trying to move as quickly as possible, but there is a lot of research and planning involved, such as deciding on the kind of engine that we will be using, where we will be storing the batteries in the Humvee, and the kind of motors and electric clutches, just to name a few things. We would like to thank Scott Willis, Dave Sabotka, John Schneider, Chuck Steltenpohl, Steve Tolen, Jerry Hargus, Crane, Indy Power Systems, Enerdel Battery, GM Remy, Cummins, Solar Sources, and Altiarnano Battery for the help we have received from them. We would also especially like to thank Brad Secrest and the NSWC, Crane ASNE chapter for allowing us to have a vendor booth and interact with all of the attendees at the conference.

Military Humvee

Students at ASNE convention are talking to the Charles B. Young,
VP of Strategic Business Planning for Oceaneering International, Inc.
(left to right: Alex Morton, Charles Young, and, C.M. Brown

Students taking measurements
(left to right: Richard Newkirk, C.M. Brown, and Josh Stieneker).

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Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
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4	5 Ray Niehaus attending & presenting at National STEM meeting	6 Ray Niehaus attending & presenting at National STEM meeting	7 Ray Niehaus attending & presenting at National STEM meeting	8 Ray Niehaus attending & presenting at National STEM meeting	9	10
11	12	13 Sen. Lugar's office visit @ Pike Central	14	15	16 PLTW teacher meeting at Evansville IVY TECH	17 Meeting with Sen. Lugar @ Indy Power Systems
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